Dr. H. F. Parsons's Report to the Local Government Board on the prevalence of Enteric Fever in the Pontardawe Rural Sanitary District, and on the general Sanitary Condition of the District.

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Assistant Medical Officer,
September 28th 1880.

The Pontardawe Registration District, Union, and Rural Sanitary District, situated partly in Glamorganshire and partly (the lesser part) in Breconshire, was formed on July 1st, 1875, by the amalgamation of the Ystradgunlais sub-district of the Neath Registration District with parts of the Cadoxton sub-district of the same Registration District, and of the Llandilo-talybont sub-district of the Swansea Registration District. The area of the district is 65,823 acres; the aggregate population of the places now comprised in it was 17,488 in 1871, and is estimated at 19,900 at the present time, having rapidly increased until the last few years, with the development of the coal trade and the tin-plate manufacture, which are the staple industries of the locality. As in many manufacturing and mining districts, centres of population have sprung up in modern times without reference to the ancient parochial and county boundaries, so that a collection of houses forming, as regards similarity of local circumstances and facilities for personal intercourse between the inhabitants, a single town or village, may be situated in two or more parishes or counties.

Topographically the district forms the upper part of the Swansea valley, and is drained by the river Tawe and its tributaries. The valley, which has a direction from north-east to south-west, is narrow and deep, having a strip of flat alluvial meadow land at the bottom, enclosed between lofty hills with steep rocky and wooded slopes. The houses are mostly situated on the lower slopes of the valley, and in the picturesque wooded combes which join it at the side; there are also isolated farms on the higher terraces of the hillsides, but the bleak bare tops of the mountains are uninhabited, and the flat ground in the valley is also avoided, as being subject to floods and heavy mists. The climate is very rainy; the average rainfall being about 70 inches yearly. Geologically the greater part of the district is made up of the sandstones and shales of the coal measures, with superficial deposits of glacial beds and peat. Anthracite coal and ironstone are extensively worked, being obtained principally by means of horizontal tunnels or "levels" driven into the steep sides of the hills, which are riddled and honeycombed with workings in progress or abandoned. On the north of the district the millstone grit, carboniferous limestone, and old red sandstone, rise in the Black Mountains to a height of 2000—3000 feet above the sea. In this portion of the district the population is very scanty, consisting chiefly of labourers employed in burning lime.

For sanitary purposes the Rural Sanitary Authority have divided their district into an eastern or upper division and a western or lower division, corresponding with the divisions for which the district medical officers are appointed, the divisions having as their centres Ystalyfera and Pontardawe respectively.

The present inspection was made in March 1880, under instructions from the Local Government Board to enquire into the prevalence of "fever" in the Pontardawe District, and generally as to the sanitary condition of the

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district. It will be convenient to speak of the latter first, as showing the local circumstances under which the fever has occurred.

House Accommodation.—The newer houses, especially in the western division of the district, are favourable examples of a well-to-do working man's cottage, being cheerful looking, well built, and commodious, with plenty of garden ground. The Inspector of Nuisances, who is a surveyor, states that every house built in the district during the last ten years has at least three bedrooms, while many have four, and that three or more bedrooms are common in houses built before that date. The reason assigned for this satisfactory state of matters is that the land in the district belongs to a few large owners who are members of the Sanitary Authority, and who in letting ground on building leases exercise a beneficial control over the kind of houses erected. In the western division too the gardens and out-premises are kept in a state of neatness and cleanliness pleasing to see; in fostering these habits a cottage gardening society has done good service. At Ystalyfera and other places in the eastern division, the houses are not, as a rule, so commodious, the amount of space allotted to each house being curtailed by the steep slope of the ground; moreover, cleanliness is not so general as in the other division.

The old cottages on the other hand are cramped for space both externally and internally; they are ill ventilated, from want of windows at the back, from the small size of the windows that do exist, and from these frequently not being made to open. They are also very damp owing to the wetness of their sites which are partly excavated in the sloping ground, to the houses themselves being sometimes set back into the hillside so that the earth abuts on their back walls to a greater or less height, to the absence of eavespouting, and to the dilapidated state of roof and walls. Of some the roofs are not ceiled. Some are overcrowded; for example, in one case a man and wife with 8 children, including grown up sons and daughters, were found occupying a single bedroom of 930 cubic feet capacity, almost without ventilation, and in which also fowls were kept.

There are no back-to-back houses, but in some instances basements which are below the level of the ground on one side, and are without through ventilation, are let separately as dwellings.

Drainage.—There are hardly any sewers in the district. The steep slope of the surface enables the rainwater which falls on it readily to run off, but the sites of the houses, especially where partly excavated, were noticed in not a few instances to be wet from the springy nature of the ground, and to stand in need of under-draining. Where there is plenty of garden land attached to the house, as is usually the case except in the more closely built places, house slops can be, and often are, innocuously disposed of by pouring them on the ground at a sufficient distance from the house. In other cases, and where the slops cannot be disposed of on the premises, they are got rid of less unobjectionably by throwing them into some neighbouring stream or into the channels at the sides of the roads. These channels are in some instances paved, and they are usually kept well flushed by the waste water from the spouts, which runs down them in a constant stream. Nuisances from accumulations of stagnant water were, however, observed in some places, especially at Ystalyfera and Brynamman.

Water Supply.—There are hardly any sunken wells in the district, except a few shallow dipping-wells. In some places river water is used for drinking or for washing; but in the lower part of their courses the streams are so spoiled by the ferruginous water poured into them from the tin-plate works, as not to be usable for any domestic purpose. With this exception, the water supply of the district is derived entirely from spouts, constantly running, locally termed "pistills." Some of these spouts are public, and have been erected by the Sanitary Authority, others are private. In some of the larger places water-pipes have been laid down, supplying a number of spouts from one source. The water is not however laid on into private premises, but has to be fetched from the spout in the street. In some cases, with a view to economize water, self-closing taps have been substituted for running spouts, but the inhabitants have an objection to the use of any water that is not constantly running, and the taps are commonly wrenched off, or fastened open.

The spouts are fed either by natural springs, or by the streams of water issuing from old coal levels. Natural springs are abundant owing to the large rainfall, and to the strata being composed of alternations of porous sandstones and impervious shales. The springs utilized for water supply commonly issue from the hill side at a level higher than the houses; the water, therefore, is not likely to be contaminated at its source. The abandoned coal levels which are used as sources of water are driven upon seams higher than those now being worked, so that the water is not liable to contamination by the drainings from the present workings, though its purity may be in some instances endangered by percolation of filth from cesspit-privies, and other sources on the surface beneath which the old workings extend. The water from the coal levels is frequently chalybeate, and in one or two cases strongly sulphuretted, yet the latter is highly esteemed for making tea, the sulphuretted hydrogen being driven off by boiling.

The spouts erected by the Sanitary Authority are fed from cisterns, some of which have been made by damming up an old level. To those cisterns which are supplied by springs the water is brought down from its source on the hill-side above in earthenware pipes with watertight joints. To the private spouts, on the other hand, the water often comes down in open channels, or pervious stone drains, in its course through which it is liable to contamination by surface impurities, or by the soakings from privies and other places of deposit of foul matters near which it may happen to pass.

Privy accommodation was formerly very deficient, but a great many privies have been built through the action or influence of the Sanitary Authority, and there are now in the larger villages few houses which do not possess conveniences of this kind. In the outlying places some houses are still unprovided with privies, filth being deposited on the surface of the ground in the immediate neighbourhood of the house. The same practice is also to some extent persisted in through the force of old habit, even where privies have been provided.

The privies are situated in almost all cases at an ample distance from the houses; in fact the tendency is to place them inconveniently far away, rather than in injurious proximity; certain privies situated at a distance of 30 ft. from the houses were considered much too near. The privies discharge either into streams or artificial watercourses, or into cesspits which are usually mere holes in the earth. In the western division the cesspits, though of primitive construction, are small and frequently emptied, and no large accumulations of excrement were observed; in the eastern division the cesspits are large and deep, extending under the privy floor, and contain great quantities of stale excrement, giving off pungent and offensive effluvia. The contents of the cesspits are either flushed away by pouring down water, or removed by hand and buried in a hole in the garden. A curious method is also in use; the privy, which is a moveable wooden structure like a sentry box, is placed over a hole dug in the ground; when this is full, another hole is dug, and the privy is removed and placed over it; the former hole being covered up. Another singular form of accommodation is that provided for the men employed at the Ystalyfera Works. A large subterranean culvert about 8 ft. in height takes the waste water from the works; into this has been made at the side an opening, approached from above by steps. From the opening a wooden platform projects partly across the interior of the culvert above the usual level of the water, and this platform is surrounded on three sides by a wooden rail which serves the purpose of a privy seat.

There are no public arrangements for the removal of excrement, nor is it in demand by farmers as manure. A row of cottages at Ystalyfera is provided with Moule's patent closets, which are scavenged weekly by the Iron Company, a mixture of copperas and sawdust being substituted for dry earth.

There are no ashpits, nor any provision for the removal of ashes. Where there is a garden the ashes are commonly placed on it day by day and dug in as manure, in other cases they are thrown on waste ground, or left in heaps in the back yard until their removal becomes necessary. Nuisances from accumulations of ashes and refuse were observed at Ystalyfera and other places. It was at one time proposed by the Sanitary Authority to provide public receptacles for the deposit of ashes under Sect. 45 of the Public Health Act, 1875, and urban powers were obtained for the purpose, but the matter appears to have been since lost sight of.

The sanitary condition of the following places may be briefly mentioned.

Ystalyfera, the largest place in the district, has an estimated population of 4,728 persons who gain their livelihood in the collieries, iron works and tinplate works of the Ystalyfera Iron Company. It is built on a steep hill-side, into which many of the houses are set back so as to be partly below the level of the ground. Some of the chapels have burial-grounds attached, which though full of graves are still in use, and which abut on the back walls of houses built on a lower level. There is considerable nuisance in places from ashes and refuse littered about, and from stagnant accumulations of house slops in the street channels. The lower part of the town has a public supply of water from a cistern formed by damming up an old coal level. The water is laid on in pipes to spouts in the public streets. In the upper part the water supply is derived from private sources, spouts or dipping wells, which are more or less open to pollution. A public supply for this part of the town has been proposed, but the question is at present in abeyance.

Cholera was very fatal in Ystalyfera in 1866, when 95 deaths occurred there. A comparison of the present state of Ystalyfera with the account of the then condition of the place given by Dr. James Rogers in his pamphlet, entitled "A Sketch of the Cholera Epidemic at Ystalyfera in 1866," shows that a very great amount of sanitary amelioration must have been effected there since that time, although further improvement is still needed.

Brynamman is a large village dependent on the works of the Amman Iron Company. For civil purposes it is in two counties and in three rural sanitary districts; viz., those of Pontardawe in Glamorganshire, and of Llandeilo Fawr and Llandovery in Carmarthenshire, the towns of Llandeilo Fawr and Llandovery, from which the two last-named districts take their name, being many miles away across the Black Mountains. Enteric fever is stated by the local medical man to be endemic in Brynamman; nuisances of various kinds, excremental and other, abound, and the water supply is in many parts scanty and bad. The main supply is from an old coal level near the Works. The direction of this level is not known, but the coal seam which it follows is shown on the Geological Survey map to crop out on higher ground some 200 yards to the northward, in a position occupied by a row of houses and a chapel with a graveyard. The water however appeared good, and suspicion had not attached to it. Other houses are supplied from small spouts or dipping wells exposed to pollution and entirely inadequate for the requirements of the population dependent on them. In one case a small spout which ran a pint in a minute and a half (120 gallons in 24 hours) was the sole source of supply for 8 cottages, the farthest of which was some 200 yards distant, up a steep and rough ascent. At a small dipping well, much resorted to, it was stated that people might be seen waiting their turn up to 11 p.m.

The Pontardawe Rural Sanitary Authority had had under consideration several schemes for supplying Brynamman with water. The scheme considered most feasible was to bring water from certain springs in the Black Mountains on the Carmarthenshire side, but it was deemed desirable that all parts of the village should share the supply and the cost of procuring it, and the co-operation of the Llandeilo and Llandovery Rural Sanitary Authorities had not been obtained at the time of the inspection.

Ystradgunlais had at the last census a population of 4,121, which has since declined owing to the stoppage of the Ynyscedwyn works in which many of the inhabitants were employed. Ystradgunlais, on account of the prevalence of enteric fever there, was inspected in 1873 by the late Dr. Gwynne Harries, who reported a want of proper water supply, and of proper excrement management, and also a grievous want of a proper system of dealing with dangerous infectious disorders. Since that date a public water supply has been provided, water being procured from a disused coal level in Cwm Guedd, and conveyed in pipes to public taps. Some of the inhabitants however prefer to use canal water. Many privies have been built, but the offensive and indecent privy arrangements at Water Street remain nearly the same as described by Dr. Harries. A row of houses, 22 in number, in this street, occupies the entire space between the street and the river, so that the houses have no ground belonging to them but what they stand upon. The privy accommodation consists of two large compound privies, one for men, under a warehouse at one end of the row, the other for women, occupying the ground floor room of one of the middle houses. Very few of the houses of this row are however at present occupied.

Sanitary Administration.—The Guardians, as Rural Sanitary Authority, meet once a month; they appear to be earnest in improving the sanitary condition of their district, but it is stated that the time allotted to their meetings is sometimes too short to allow matters to be thoroughly gone into.

The Rural Sanitary Authority were invested by the Local Government Board by an Order dated August 24th, 1877, with urban powers, as regards portions of their district, under the following sections of the Public Health Act, 1875:—

S. 42, as regards cleansing and watering of streets.
S. 45, as regards provision of receptacles for deposit of rubbish.
S. 114, as regards offensive trades.
S. 160, sub-section 1, naming streets and numbering houses.
,, ,, 3, ruinous and dangerous buildings.
S. 161, as regards lighting of streets.
S. 169 and S. 170, } as regards regulation of slaughter houses.

The district medical officers, Drs. G. Griffiths and D. Thomas, are appointed medical officers of health under the Local Government Board's Order; they make frequent inspections of their districts and discharge their duties with zeal and efficiency, as also does the Inspector of Nuisances, Mr. Morgan. The medical officers of health are furnished with quarterly returns of deaths within their district, and with immediate notice of deaths from infectious diseases other than those which have occurred in their own practices.

There is no hospital accommodation in the district for persons suffering from infectious diseases, except for paupers, for whose use certain wards have been provided at the recently erected workhouse, now just opened.

Vital Statistics.

PONTARDAWE RURAL DISTRICT.

Year.	Births.		Deaths.		Deaths under one year.		Deaths from							
	Number.	Rate per 1,000 population per annum.	Number.	Rate per 1,000 population per annum.	Number.	Per 100 births.	Small pox.	Measles.	Scarlet fever.	Diphtheria.	Whooping cough.	Fever.	Diarrhœa.	Violence.
1875 6 months -	394	39·7	194	19·5	69	17·5	1	2	10	—	15	4	5	10
1876 - -	894	44·9	369	18·5	100	11·2	—	—	—	—	3	16	8	21
1877 - -	853	42·9	324	16·3	82	9·6	—	3	2	1	1	12	5	15
1878 - -	740	37·2	334	16·8	88	11·9	—	2	—	—	17	17	5	15
1879 - -	738	37·1	367	18·4	107	14·5	—	—	—	2	18	22	5	24
Average of 4½ years - -	804	40·4	353	17·7	99	12·2	0·01	0·07	0·13	0·03	0·60	0·79	0·31	0·95
England and Wales. - -	—	35·8	—	21·0	—	14·5	0·08	0·35	0·71	0·12	0·49	0·40	0·82	0·72

Rates per 1,000 population per annum.

The above table, in computing which the population of the district has been taken at 19,900, shows the general mortality to be well below the average of England and Wales; still more is it below that of most mining and manufacturing districts. The mortality among infants is also below the average, as well as that from the several particular causes specified above with the exception of whooping cough, fever, and violence. The deaths from violence are usually numerous in mining districts, where accidents are of frequent occurrence.

The mortality from phthisis is high, the annual death-rate from this disease having been 2·88 per 1,000 on the average of the 4½ years 1875–79, that for England and Wales, 1875–77, having been 2·15. The medical officer of health for the western district, who has made special enquiries on this point, believes hereditary predisposition intensified by frequent intermarriages, to be the chief predisposing cause of phthisis operative in the district. The damp nature of the climate and the wetness of the soil in many places must also be taken into account, and it is possible that the acrid vapours of aerolein given off from the heated oil used at the tin-plate works may aggravate pulmonary complaints.

Enteric Fever.—The following table shows the number of deaths from "fever" in the Pontardawe Registration District in each quarter since the constitution of the district.

Quarters ending	1875. 2d half-year.	1876.	1877.	1878.	1879.
March 31st	—	4	3	4	3
June 30th	—	5	3	3	3
September 30th	1	2	1	4	6
December 31st	3	5	5	6	10
Year	4 (half-year)	16	12	17	22
Number of the above cases certified as "enteric fever"	4	13	10	10	19

It thus appears that some deaths from fever, more or fewer, have occurred in the district in every quarter since July 1875, but that they have been especially numerous in the latter half of 1879. We have therefore to consider, and if possible, account for—

1st. The persistent endemic prevalence of enteric fever in the district.

2nd. Its exceptional development in the autumn of 1879.

1st. The continued prevalence of fever in the district appears to be due to unwholesome conditions, formerly neglected, which the greater measure of care devoted to sanitary matters in the last few years has not yet wholly remedied. We find that although the death rate from fever is high now, yet it has apparently been higher still in times past. Although we have not statistics of the Pontardawe district further back than the middle of 1875, we have those of the former Ystradgunlais sub-district, now forming part of the Pontardawe district, but previously included in the Neath district, and containing in 1871 12,433 inhabitants. In this sub-district the death rate from "fever" in the five and a half years 1870-75 was 1·21 per 1,000 per annum. Before 1870 we have only the statistics of the entire district of Neath (population in 1871, 64,619), in which the average fever death rate for the ten years 1861-70 was 1·50 per 1,000. From the account of the sanitary condition of Ystradgunlais in 1873 given by Dr. Gwynne Harries in his report to the Local Government Board on the prevalence of enteric fever there, and from what we learn of the state of things in Ystalyfera at the time of the cholera visitation in 1866, as described by Dr. Rogers in the pamphlet before referred to, it is evident that the local conditions favouring the propagation of enteric fever must formerly have been abundantly present in the district. Although since then much improvement has been effected, yet in parts of the district, as at Brynamman, impure sources of water supply and excrement nuisances are still common, and explain why in such places enteric fever should continue to maintain its hold. In other places in the district it is stated that enteric fever was formerly endemic, but has disappeared since sanitary improvements have been effected there. Unfortunately it is not possible to apply numerical tests, for the reason that, as before stated, the distribution of the population bears no relation to the boundaries of parishes and districts adopted for statistical purposes.

2nd. The increased amount of fever in the latter part of 1879 was due to the extension to the district of an epidemic of enteric fever in the adjacent borough of Swansea. This epidemic (which was traced by the medical officer of health of Swansea to the probable contamination of the principal reservoir supplying the borough with water, with the excreta of a patient ill of fever in a neighbouring farmhouse) commenced suddenly at the beginning of

August. Among the earliest cases were several young persons whose friends resided in the Pontardawe District, and who, when they were taken ill, went home to be nursed, and became the starting points for outbreaks more or less serious.

The deaths from enteric fever in the Pontardawe district in 1879 occurred at the following places:—

Eastern Division	Caegurwen (Brynamman)	4
	Ystalyfera	5
	Ystradgunlais Lower	1
	Cilybebill	1
Western Division	Mawr Llanguicke	3
	Rhyndwyclydach	5
		19

The following are the particulars relating to the occurrence of enteric fever in the several places mentioned.

Brynamman.—The sanitary conditions of this place as before described are favourable to the dissemination of enteric fever, and it appears from the reports of the medical officer of health and from the testimony of the local medical practitioner that fever is hardly ever absent from it. A form of continued fever was especially prevalent in 1879 in Brynamman, Caegurwen, and other places in that neighbourhood. It was apparently enteric fever, but of a different type to that which had its origin in the cases imported from Swansea, being, as the local medical men agreed, less severe and less characteristic than the latter, with less tendency to diarrhœa and other abdominal symptoms, and usually without typhoid spots on the body, but frequently accompanied by the skin affection termed erythema nodosum. Among the cases however in Brynamman and the neighbourhood, were some which were said to be undoubtedly enteric fever; one case which I saw with the medical officer of health, presented the rose spots and other symptoms characteristic of that disease.

A good many cases of enteric fever occurred in Park Street, Brynamman, in 1878–79. The first case, a typical one, was a girl who came ill from Llanelly to her home at the Crown Inn, Park Street. The privy at the inn, 30 yards distant from the house, discharges into an open ditch, which is in a very foul state. The water is from a spout higher up on the other side of the road. Two other persons living in the same house subsequently contracted the disease, one of whom, a servant, was taken in the early part of 1879 to the house in which her parents resided, on the other side of the street. The privy into which her excreta were thrown abuts on the end of this house, and has a large rough cesspit, from which there appears to be leakage into the cellar under the house. Two other cases occurred in this house in 1879 at intervals of several months, and others were traced to communication with it.

Fever is said to occur with especial frequency in Cannon Row, Brynamman, This street is situated in an elevated open and somewhat isolated position. The inhabitants are dependent for water upon two sources:—1st. An old coal level converted into an underground dipping well reached by steps. The dirty water from the row of houses above runs down the channel at the side of the road, and at the point of approach to the well spreads out into a broad pool, into which people going to the well can with difficulty avoid stepping; foul matters are thus likely to be carried on the feet to soil the steps of the well and contaminate the water. 2nd. A small spring or dipping place in an adjoining meadow, the neighbourhood of which appears to be habitually resorted to by persons wishing to ease themselves, excrement being deposited around in such positions that the first heavy shower must wash it into the spring.

Such percolation would be favoured by the heavy rainfall which occurred in the latter part of August. From August 16th to 30th 8 inches of rain fell, including more than an inch on the 16th, and 3½ inches during the two days, August 26th and 27th.

In 1878 several cases of enteric fever occurred in a row of cottages at Caegurwen, above Brynamman. This outbreak was attributed by the medical officer of health to the nuisance which then existed from the leakings of the privies running over the ground at the back of the cottages. The privies, which are of the cesspit kind, are 30 feet from the houses. They had been repaired, and no leakage from them was found at the time of my visit, but there was considerable nuisance from the slop-water, which ran in an open gutter on to a piece of common land adjoining the houses.

Two cases were met with at Brynamman in the course of the inspection, in which the patient had apparently contracted enteric fever in washing the linen of persons affected with the disease.

The form of enteric fever which prevailed in Brynamman in 1879, spread subsequently to other places in the neighbourhood to which it must apparently have been carried by human intercourse, as, for example, to Cwmllynfell, a scattered hamlet on the other side of a watershed, and to an isolated farm-house on the hill-side above.

Cwm Twrch, a long straggling village lower down the valley was next attacked, and the disease had not wholly subsided there at the time of my visit. The water supply of Cwm Twrch is chiefly derived from the river Twrch, into which many of the privies discharge.

Ystalyfera.—This place had in the beginning of August 1879 been for some months free from enteric fever. In the second week of that month four young women employed in shops at Swansea were brought to their respective homes in Ystalyfera, all suffering from enteric fever of a somewhat severe type, with copious diarrhœa. From these cases, as from so many centres, the fever after a while spread through the village in an epidemic form until by the end of December upwards of 100 cases had been reported.

A group of cases in Allt-y-grug Road was traced by the medical officer of health, with whose conclusions Dr. Airy, who happened to be there at the time agreed, to the use of polluted water. On August 9th a girl L. G. one of the four before-mentioned was brought home from Swansea to a house in Allt-y-grug Road, marked 1 on the accompanying Map A. (See also Map B.) She had been ailing since August 6th with what proved to be a well-marked attack of enteric fever, attended with considerable diarrhœa. Her stools were thrown into a privy marked 2 on the Map. This privy, one of a pair used in common by the inmates of six houses, is situated in a recess of the ground at the mouth of an old coal "level," it has a large deep cesspit, from which a line of earthenware pipes leads to a tank in a field at a little distance, as shown on the enlarged plan. Nearly under it, in the direction of the dip of the strata, runs a second abandoned "level," driven upon a seam of coal some yards lower than the first. A stream of water draining from the lower "level" is conveyed by iron pipes into a stone cistern from which it again issues through a spout at which vessels may be filled. The ground between the privy and the cistern is, in part at least, a heap of loose shale brought out of the upper "level" and concealing the mouth of the lower one. It is therefore highly probable that the contents of the cesspit could gain access to the water by percolation, either through the heap of loose shale, or into the old working below. Such percolation would be favoured by the heavy rainfall which occurred in the latter part of August. From August 16th to 30th, 8 inches of rain fell, including more than an inch on the 16th, and 3½ inches during the two days August 26th and 27th. L. G. was brought home as aforesaid on August 9th, and the contents of the cesspit probably became specifically infected soon afterwards. At that time the inmates of some 30 to 40 houses, all those situated within the dotted line on the map, used for all purposes water drawn from the cistern, marked 3, and in most of these houses, viz., those coloured red on the map, cases of enteric fever subsequently occurred. The earliest case after L. G. began on September 6th, and between that date and October 10th, 38 cases of enteric fever commenced all among persons known to drink water from the cistern (3).* Most of these cases were

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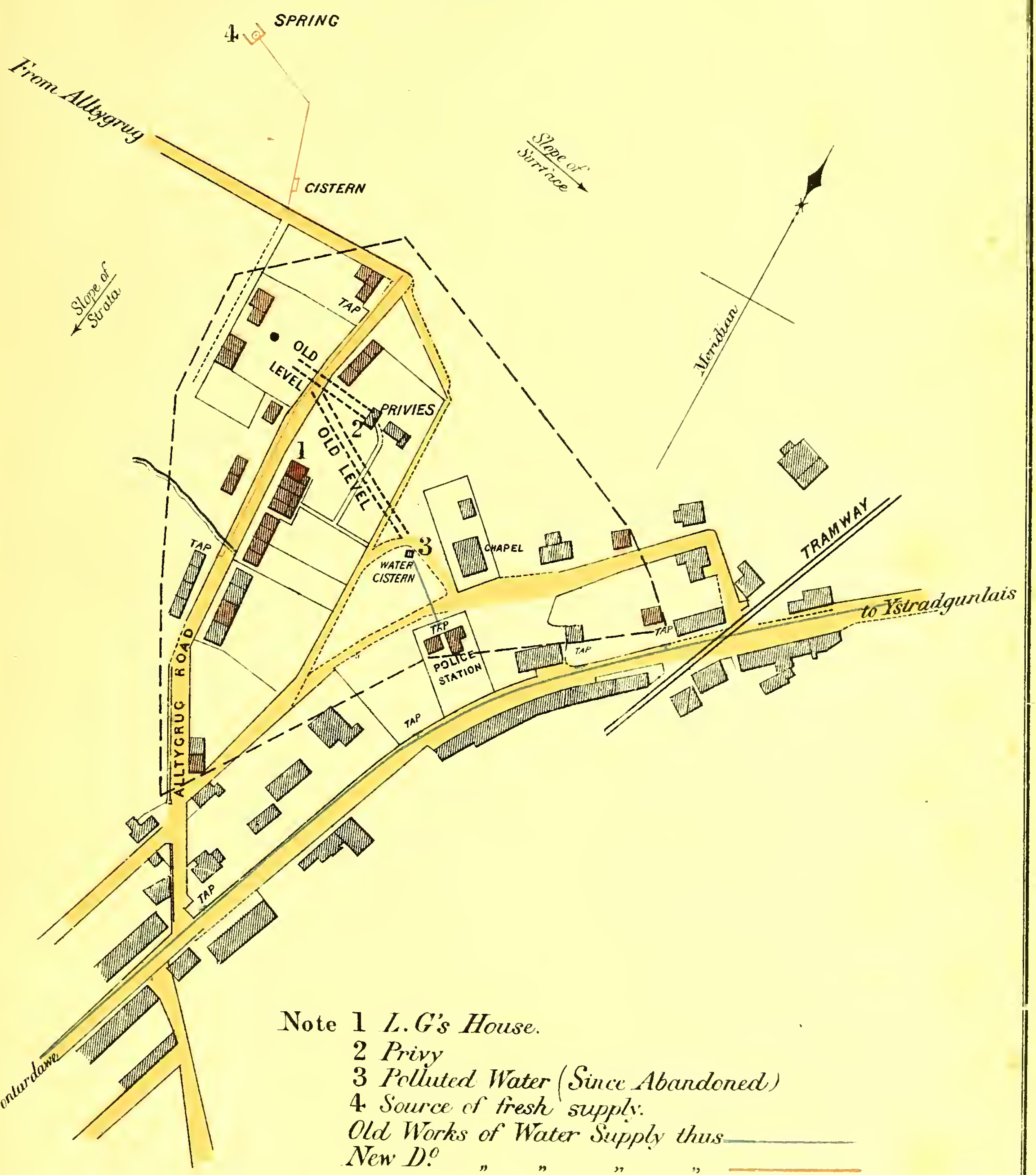
* The sequence of cases in the several weeks was as follows :—
Week ending Sept. 6, 1 person, newly attacked.
„ Sept. 13, 8 persons „
„ Sept. 20, 13 „ „
„ Sept. 27, 11 „ „
„ Oct. 4, 2 „ „
„ Oct. 7, 2 „ „
„ Oct. 14, 1 person „

PLAN OF ALLTYGRUG PORTION OF YSTALYFERA.

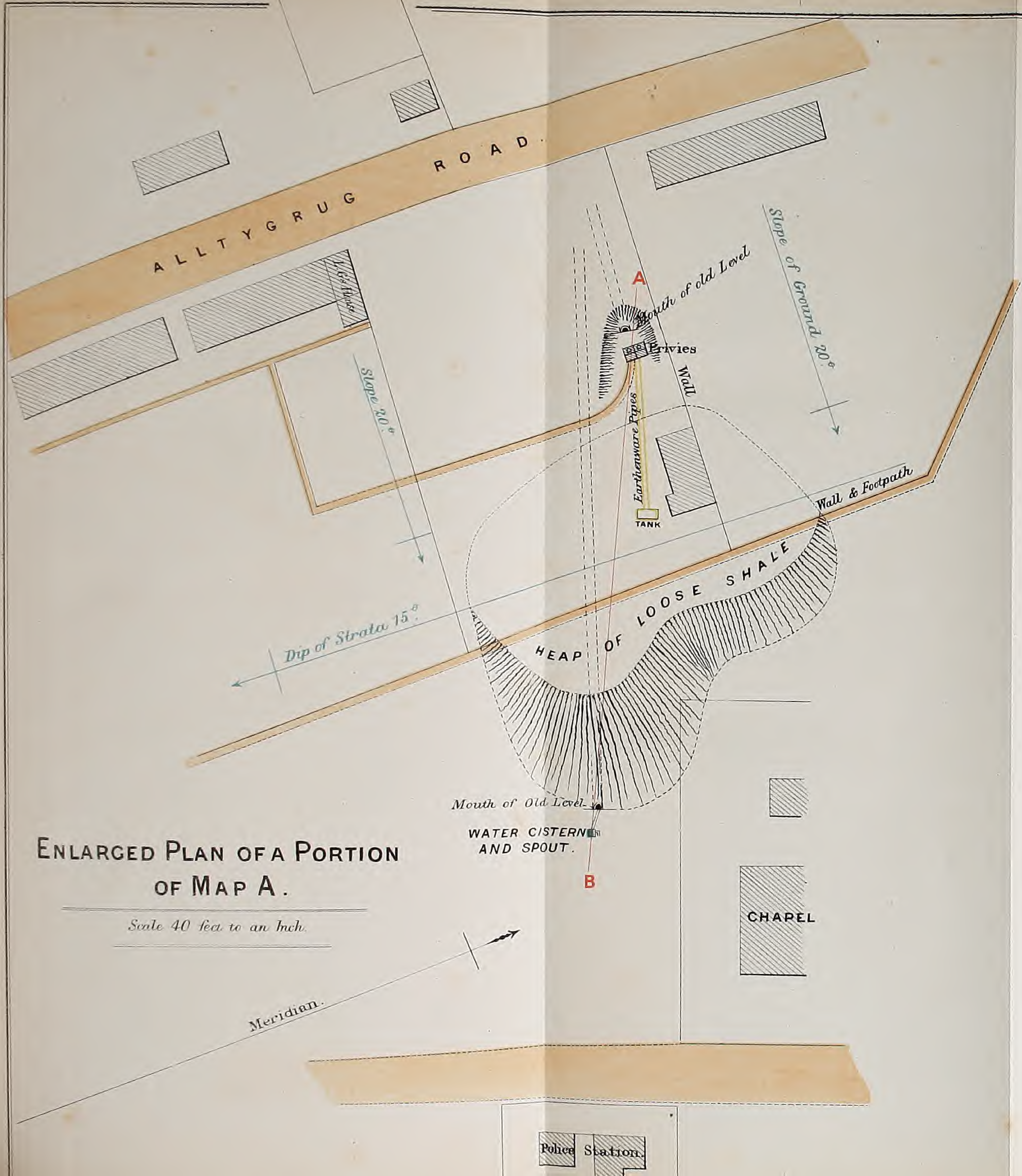
Scale 208·33 Feet to an Inch.



Note 1 *L. G's House.*
2 *Privy*
3 *Polluted Water (Since Abandoned)*
4 *Source of fresh supply.*
Old Works of Water Supply thus ——
New D^o „ „ „ „ ——

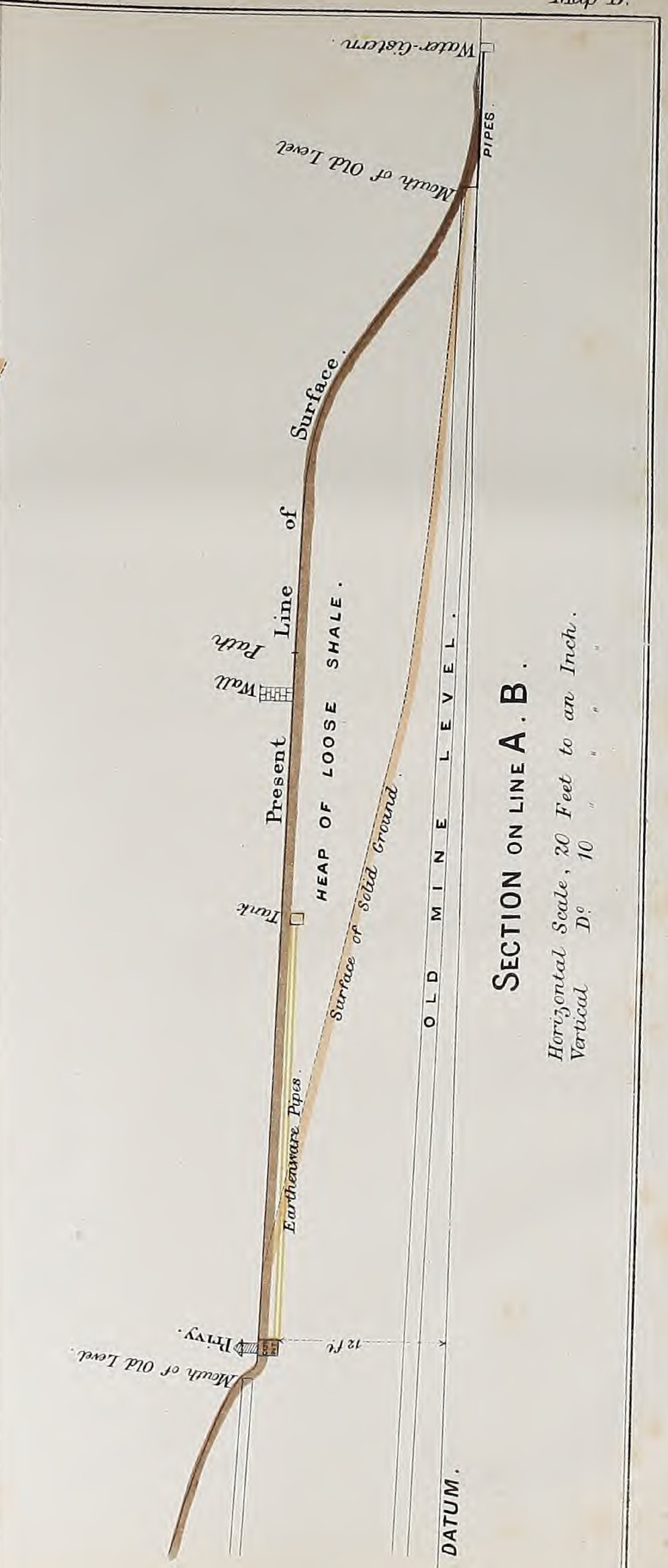
Houses in which cases of enteric fever occurred are coloured red.

Dangerfield, Lith. 22 Bedford St Covent Garden



ENLARGED PLAN OF A PORTION OF MAP A.

Scale 40 feet to an Inch.



SECTION ON LINE A. B.

Horizontal Scale, 20 Feet to an Inch.
Vertical Dº 10 " " "

of a somewhat severe type, and two were fatal. The suspected cistern was closed on September 26th; and after October 10th the outbreak ceased so far as regards its especial incidence upon the houses supplied with water from this source. A new supply of water from an uncontaminated source was brought down to Allt-y-grug Road by the Sanitary Authority and was completed on December 5th.

In the other cases the exact method of propagation of the disease was not so clear: it might have been by personal intercommunication, by polluted water, or by emanations from privies and foul gutters, into which fever excreta had been thrown. In the part of Ystalyfera in which there are no public taps, the streamlets are frequently more or less liable to pollution in the open part of their course down the hill side, between the springs in which they rise and the spouts at which the water is drawn for use.

By December the disease had become somewhat generally diffused through the place and it had not wholly subsided at the date of inspection in March 1880, one well marked case being seen by me. The fatal case in Ystradgunlais formed part of the Ystalyfera outbreak, being in a house adjoining that place. The village of Ystradgunlais itself, a mile or two away, escaped.

A group of seven cases of enteric fever which occurred in 1877 in a low-lying part of Ystalyfera called the Gurnos, were considered by the medical officer of health to have received the infection through the vehicle of milk. They were attacked simultaneously, and were all in the habit of using milk procured from a dealer who lived in a small overcrowded house, and stored his milk previous to sale in a badly ventilated pantry, leading out of the living room of the family, his son at the time lying in the house ill of enteric fever.

The fatal case in *Cilybebill* was one of three that occurred in an isolated farm-house; the first of these, which begun on September 15th, was the farmer's wife, who was in the habit of attending Swansea market and probably contracted the disease there.

Mawr Llanguicke.—Of the three deaths from enteric fever in this township in 1879, one occurred in a house in Ynysmedw Row. In this house seven members of the family were ill with fever at the same time, and there were four cases in other houses in the row. The first case commenced on August 15th. No clear history of introduction of infection was made out, but the mother, who herself escaped, had been shortly before to see some relations near Swansea who were ill, but of what disease she could not say. A death from enteric fever occurred in the same row in 1878. The sanitary condition of the row at the time when the fever broke out was stated to have been very imperfect. A drain which ran at the back of the row was stopped up, and from an untrapped grid close to the back door of the house in which the fever occurred very offensive odours were said to have come up. The closets, which are at the top of the garden, some distance from the houses, have pipes by which the excrement is conveyed away into the canal. Since that time the drains have been put into good working order, and a stream of water has been diverted through them to keep them clean.

Another case was a young woman who came home from Swansea, on or about October 18th, with her fatal illness upon her.

The third death was also due indirectly to importation from Swansea. A young man, E. G., who had been living in Swansea, came home ill, on or about September 4th, with pains in the head and diarrhœa, but was not seen by any medical man until a week after his return, when he was found suffering from enteric fever; in the meantime he had been visited by his relations and friends living in the neighbouring houses, who assisted in nursing him, and of whom six took the disease, the dates of their commencing to be ill being September 14th (2 cases), 16th (2), 17th, and 26th. One of them, a cousin of E. G., who had assisted in nursing him, died. The persons attacked in this outbreak resided in five cottages some 50 or 100 yards apart: two of the cottages, E. G.'s and another, were at the side of one road, two of the others by the side of another road at a lower level; the cottages in each case being on the side of the road on which the ground was highest. The sanitary condition of the cottages was good. Each cottage had its own privy, at a distance from the house. All drew their water supply from a spout on the other side of a small ravine, used by many others, and which could not possibly be contaminated by the excreta of the fever cases. It was stated that the excreta of E. G. were mixed with disinfectants and buried in the earth, but this was probably not done at the commencement of his illness. The house slops were in part at least, thrown into a gutter by the side of the upper road, and might possibly have contaminated a small spout at the back of one of the lower houses, but the water of this spout was said never to be used for drinking, and was not likely to have been used except at the house next it. Altogether it did not appear that there was any mode by which the infection could have been conveyed from case to case except by direct transmission. All those who took the disease had been in communication either with E. G., or with those attacked after him.

The medical officer of health for the western division states that the relatives, friends, and neighbours of a sick person commonly assemble at the house to assist in the nursing; that after doing so they are not always careful to wash their hands before eating or preparing food; and that with a view to induce the patient to take nourishment they often drink out of the cup which he has tasted and put aside.

Rhyndwyclydach.—The history of one of the outbreaks in this township is similar to the last. A young woman who was in service near Swansea returned home on October 18th to her parents' house at Clydach, suffering from what proved to be enteric fever, and died on November 11th. On October 29th two of her neighbours living in the same row of houses, who had been to see her, sickened with fever, and both of them died. The sanitary condition of these houses is excellent; the water is good, and the privies are at a distance, and on lower ground.

A case of enteric fever which had occurred at Clydach 9 weeks before, was convalescent at the time of my inspection. No history of infection was ascertained, and nothing was found in the cottage or its surroundings to account for the attack. It appeared however that the patient, who was employed in a tin-plate manufactory, was in the habit of stopping on the way thither to get water for drinking while at work, from a pump in the urinal at the railway station. This pump, the only one met with during the inspection, forces water from a shallow well in alluvial soil, to supply the cistern of the station waterclosets. The waterclosets drain into a cesspool, which is said never to have been emptied, and is about four yards from the well. The well water is probably contaminated with the soakage from the closets; it may be infected by the excreta of some passenger suffering from a mild form of enteric fever. The other workpeople got their water from another source, and none of them suffered from fever.

Disinfectants were freely furnished at the cost of the Sanitary Authority to the households in which enteric fever occurred, and instructions were given to those in attendance on the patients to disinfect the stools, and bury them at once in the ground.

I have to acknowledge the courteous aid which I have received from the medical officers of health, Drs. Griffiths and Thomas, whose careful inquiries into the causes of the disease at the time of its occurrence have afforded me great assistance, and from Mr. Morgan, the surveyor and inspector, to whom I am indebted for the plans accompanying this report.

H. FRANKLIN PARSONS, M.D.

Local Government Board,
June 1st, 1880.

Recommendations.

1. The Sanitary Authority should see that every house within the district is provided with proper drainage.

2. They should also see that the occupants of each house have access within a reasonable distance to a sufficient supply of wholesome water, and should diligently exercise the powers vested in them by the Public Health Act, 1875, and the Public Health (Water) Act, 1878, to provide, or cause to be provided, such supplies, to protect existing supplies, and to close polluted wells.

3. Arrangements should be made for the removal and disposal of excrement in such a manner as not to create a nuisance. A sufficient water-closet, earth-closet, or privy should be provided for houses which have no such accommodation. Cesspits in connection with privies should be abolished, or reduced to the smallest practicable dimensions, made watertight, and frequently emptied. The discharge of privy contents into a stream should not be permitted. In view of the circumstances of the district the earth-closet system will probably be found specially applicable. In reference to these matters the report issued by the Local Government Board "On certain means of preventing excrement nuisances in towns and villages" may be consulted.

4. Provision should be made, particularly in the more closely built places, for the deposit of dry house refuse in such manner, and for its removal with such frequency, that no nuisance may arise from it.

5. Steps should be taken for the abatement of overcrowding, where it exists; and to cause all houses which from originally defective construction or otherwise are in a state injurious to health to be closed.

6. The Sanitary Authority should put in force the powers they possess under the Public Health Act, 1875, to prevent the propagation of disease by infected persons or things.